Fall 9-1-2006

EVST 295.53: Society in a New Energy Age - Online

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University of Montana - Missoula

AASC 295T.51 / EVST 295.53 TENTATIVE SYLLABUS

The University of Montana College of Technology

COURSE TITLE: AASC295T/EVST 295 SOCIETY IN A NEW ENERGY AGE

Credit Hours: 3

Lecture Hours per Week: 3

Lab Hours per Week: 0

On-line Class Fall 2006

COURSE DESCRIPTION:

Estimates vary, but world oil production will peak within our lifetime. Although oil reserves won't dry up for many more years, this event coupled with depletion of other fossil fuels, environmental concerns, and political and social instability in oil producing countries will affect the commercial and social fabric of our industrial culture. A new energy paradigm will emerge to power the world's economies. Alternative energy technologies, distributed generation systems located at or near the end-user, and hydrogen are likely to be key components of this new paradigm. This course will explore within a social and cultural context the issues of energy supply, sustainability, security, economic development, environmental protection, and transitional strategies as they relate to conventional energy technologies, alternative energy technologies and opportunities to create a new energy age.

PREREQUISITES: None this term.

Course Materials: All readings will be available on-line in Blackboard or on the Internet. Some of the readings in Blackboard are large. If you do not have on-campus or other high speed Internet access, you may want to purchase the United Nations' 2000 World Energy Assessment: Energy and the Challenge of Sustainability. We read 6 long chapters from this book and portions of others. It is available from several on-line booksellers for $55-65. We also read 3 chapters from Jeremy Rifkin's The Hydrogen Economy, and several of the articles in the distributed energy and hydrogen units could be replaced with other chapters in Rifkin's book. You can get copies of Rifkin's book for under $10 on the Internet. If you are having problems accessing any articles, please contact the instructor immediately. Many of the articles can be made available at the Mansfield Library in the reserve section or via other mechanisms.

General Course Goals: In order to prepare students to advise clients and policy makers about alternative energy choices, this course is designed to give students an understanding of the far-reaching economic, social, and environmental effects of today's fossil-fuel energy regime and of possible future energy regimes. Additionally, this course will help students develop planning, analysis, decision making, and communication skills needed to be change agents and advocates for more sustainable energy practices.

STUDENT OUTCOMES: It is expected that upon completion of this course students will be able to:

- Describe the role of energy in the development of society and culture;
- Use planning and decision making techniques that incorporate economic, social, and environmental concerns to produce plans and strategies that address the needs of multiple stakeholders and foster sustainable practices;
- Create basic systems models of complex interrelated social systems;
- Describe the infrastructure and the social, environmental, and economic implications of the current energy regime;
- Identify trends that will affect the energy regime in the future;
- Evaluate and describe the benefits, costs, implications, and potential to displace fossil fuels of various alternative energy supply options;
- Evaluate and describe the benefits, costs, and implications of distributed generation;
- Evaluate and describe the benefits, costs, implications of hydrogen technologies;
- Formulate scenarios for the future energy regime, evaluate their desirability and sustainability, and trouble shoot potential problems;
- Describe tools available to promote a smooth transition away from fossil fuels to a new energy regime;
- And make and communicate informed opinions about energy systems, technologies, and policies.

EXPECTATIONS: To insure successful completion of this course, students should plan to:

- Check the announcements page daily to keep informed of any changes to the tentative schedule,
- Complete approximately one learning unit a week,
- Participate in online discussion groups on a regular basis,
- Turn in all assignments in a timely manner,
- Take exams during the specified times unless other arrangements are made with the instructor,
- Follow the University of Montana Code of Conduct (i.e. no cheating, plagerism, etc). See http://ordway.umt.edu/SA/VPSA/index.cfm/page/1321 for details,
- And contact the instructor as soon as you realize you are having problems with any component of the course.

GRADING: Grades in this course will be based on a combination of homework, participation, exams, and the final project/paper. A student needs to earn at least 90% of the points offered to receive an A, 80% for a B, 70% for a C and 60% for a D.

	Points per Assignment or Exam	Total Points Available
Homework	10	100
Participation	5-10	200
Exams	100	300
Final Project Paper	200	200
Total		

HOMEWORK: There are 10 homework assignments worth 10 points each. Homework assignments are designed to give students a chance to practice evaluating, analyzing, and synthesizing information provided. Some assignments will require independent research. All assignments should be considered formal papers, no matter how short. As such, all spelling and grammatical rules should be followed. Papers should include a title, an introduction, discussion, and a conclusion. Please double-space all text, use 11 point or greater font, and observe page limits listed. One point will be deducted for each calendar day that an assignment is late. Missing assignments will receive a grade of 0.

PARTICIPATION: There will be one or two discussion questions or participation activities posted for each of the 12 units. Participation exercises are designed to give students a chance to interact with the instructor and other students, to clarify concepts from readings, and to provide practice in evaluation, analysis, and synthesis of the information provided. Students should post at least two responses to each discussion question as a means to engage in an on-line dialog with the instructor and other students. You will not be able to change or remove a post after it has been sent to the discussion board, so consider creating posts off-line to allow you to make modifications. Your response to each discussion question is worth 5 to 10 points (point value will be specified in the introduction to each discussion). You will not get credit for postings after the end date specified.

EXAMS: There will be three exams, one after each of the first three sections. Exams will test concepts and definitions presented in the readings or instructor provided information, and will include minimal amounts of evaluation, analysis, or synthesis work. Students will be given one hour to complete each exam and must complete the exam in one sitting on the day the exam is scheduled. Contact the instructor as soon as possible if you will be unable to complete and exam on the date scheduled.

FINAL PROJECT PAPER - Visions of a Sustainable Future
Based on work in this class and independent research, you will be asked to propose a future energy scenario for one energy end use, such as personal transportation, freight hauling, residential heating and lighting, commercial heating and lighting, or industrial processing heat or energy for one industry. You will prepare a ten-page report describing

the technology options available, the advantages and disadvantages of each option, the technology or technologies you recommend, and mechanisms to encourage the transition to your proposed system. Further details will be given during Unit 2 of the course. The Final Project will be due during the last week of the course.

COMMUNICATIONS FROM AND WITH THE INSTRUCTOR: The on-line format for this class makes electronic communication with students a very important portion of the course. Although most communication will be done through Blackboard Announcements, Discussion Board postings, or the Digital Dropbox, the instructor may occasionally wish to send email to students. Please take a few minutes to verify that the email address listed in the Student Information Section of your Blackboard account is for an account that you monitor frequently and that the address is correct. Feel free to send email to the instructor at the email address given in the Faculty Information Section. Allow two business days for a response (e.g. don't send a note on Friday and expect a reply before Monday or Tuesday).

COURSE BIBLIOGRAPHY: To facilitate referencing articles and readings used in this course, a course bibliography has been prepared and posted to the Blackboard site for this class. The bibliography is organized by author name. As such, all readings or other information will be referenced by author name in the course materials. The bibliography contains links to any materials that were originally posted on-line, as well as publisher information, so you may access any references used.

TOPICAL OUTLINE:

Section I - The Larger System(s) and Tools to Analyze It

Unit 1 - An Introduction
Topics: Course overview (schedule and requirements), the role of energy in societal development and decline

Unit 2 - Planning and Decision Making
Topics: Planning, decision making, forecasting, scenarios, backcasting, ethics.

Unit 3 - Understanding Critical Human and Natural Systems
Topics: Economic systems, efficient markets, social systems, stakeholder theory, natural cycles, system interactions, the role of energy.

Section II - The Current Energy Regime and Its Impacts

Unit 4 - Today's Energy Industry
Topics: Energy chains, Energy infrastructure, economies of scale, centralized control, driving forces.

Unit 5 Energy Supply and Security Issues
Topics: Energy resources, Hubbert's Peak, fossil fuel production estimates, energy demand, energy security.

Unit 6 - Energy, Politics, Culture and Social Issues

Student Outcomes: Describe the social, political, and cultural implications of the current energy regime; Identify trends that will affect the energy regime in the future;
Topics: Impacts of politics and culture on energy security, colonialism, militarism, Islamic fundamentalism, poverty, developing countries, population, urbanization, lifestyle impacts, equity.

Unit 7 - Environmental and Health Impacts of Energy Use

Topics: Energy impacts on the environment and health, pollutants, greenhouse gas controversy and potential impacts of greenhouse gases, carbon mitigation, natural debt.

Section III - Potential Technologies for the Future Energy Regime

Unit 8 - Energy Technology Options

Topics: Solar, wind, biofuels, biomass, geothermal, hydro, marine energy, fission, fusion, advanced fossil fuel technologies, energy efficiency, carbon sequestration.

Unit 9 - Distributed Energy

Topics: De-centralized energy generation and control, reliability, security, independence, developing countries.

Unit 10 Hydrogen

Topics: Decarbonization of fuels, energy storage, hydrogen production, "solar" hydrogen, impacts of hydrogen technology, hydrogen energy web.

Section IV - Transitioning to a New Energy Age

Unit 11 Potential New Energy Regimes and Their Impacts

Topics: Energy scenarios, international relations, redistribution of power & influence, social interaction, sustainable communities, poverty, environmental issues, role of fossil fuels, infrastructure change.

Unit 12 - Tools for Transition

Topics: Energy policy, stimulating research and development, market mechanisms, business opportunity innovation diffusion theory, social choice, the green consumer.